National Institute of Environmental Health Sciences

Arbovirus models to provide practical management tools for mosquito control and disease prevention in the Northern Territory, Australia

Author(s): Jacups SP, Whelan PI, Harley D
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Abstract:

Ross River virus (RRV) causes the most common human arbovirus disease in Australia. Although the disease is nonfatal, the associated arthritis and postinfection fatigue can be debilitating for many months, impacting on workforce participation. We sought to create an early-warning system to notify of approaching RRV disease outbreak conditions for major townships in the Northern Territory. By applying a logistic regression model to meteorologic factors, including rainfall, a postestimation analysis of sensitivity and specificity can create rainfall cut-points. These rainfall cut-points indicate the rainfall level above which previous epidemic conditions have occurred. Furthermore, rainfall cut-points indirectly adjust for vertebrate host data from the agile wallaby (Macropus agilis) as the life cycle of the agile wallaby is intricately meshed with the wet season. Once generated, cut-points can thus be used prospectively to allow timely implementation of larval survey and control measures and public health warnings to preemptively reduce RRV disease incidence. Cut-points are location specific and have the capacity to replace previously used models, which require data management and input, and rarely provide timely notification for vector control requirements and public health warnings. These methods can be adapted for use elsewhere.

Source: http://www.ncbi.nlm.nih.gov/pubmed/21485389

Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Meteorological Factors, Precipitation, Sea Level Rise, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Australasia

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Ross River Virus

Medical Community Engagement: ☑

resource focus on how the medical community discusses or acts to address health impacts of climate change

A focus of content

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Short-Term (

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content